Claims

1. A catheter assembly comprising,

an elongated body having first and second ends and an outer wall,

a dilatable bladder incorporated with said elongated body, and adapted to dilate in a radially outward direction from said elongated body, and

a thermally responsive indicator incorporated with at least a portion of said dilatable bladder and adapted to exhibit a state in response to detecting a change in temperature.

2. The catheter assembly of claim 1, wherein said elongated body defines a first internal lumen extending from said first end to said second end, said dilatable bladder is in fluid communication with said first lumen, and inflates in response to a positive fluid pressure in said first lumen.

3. The catheter of claim 1, wherein said catheter is adapted for insertion into a body of a mammal and said change in temperature is caused by a said thermally responsive material being located in proximity of a blood vessel.

4. The catheter of claim 1, wherein said catheter is adapted for insertion into a human body and said change in temperature is caused by a proximity of a portion of said dilatable bladder to a blood vessel crossing a ureter.

5. The catheter assembly of claim 1, wherein a portion of said elongated body is adapted to form said dilatable bladder.

6. The catheter assembly of claim 1, wherein said dilatable bladder has an inner surface and said thermally responsive indicator is disposed on at least a portion of said inner surface.

7. The catheter assembly of claim 1, wherein said dilatable bladder has an outer surface and said thermally responsive indicator is disposed on at least a portion of said outer surface.

8. The catheter assembly of claim 1, wherein said thermally responsive indicator includes a thermochromatic material.

9. The catheter assembly of claim 1, wherein said dilatable bladder is formed from a first material and said thermochromatic material is disposed within said first material.

10. The catheter assembly of claim 1 further comprising a detector element adapted for detecting said state of said thermally sensitive material.

11. The catheter assembly of claim 10 further comprising a detector lumen extending between said first and second ends of said elongated body, and being adapted for receiving said detector element.

12. The catheter assembly of claim 10, wherein said detector element is a fiber optic camera adapted to enable an operator to view said state of said thermally responsive material.

13. The catheter assembly of claim 1 further comprising, a surgical cutter adapted to enable an operator to cut mammal flesh at a location other than a location of temperature change detected by said thermally responsive indicator.

14. The catheter assembly of claim 1, wherein said dilatable bladder extends around only first portion of a periphery of said elongated body and said catheter assembly further comprises a surgical cutter adapted to enable an operator to incise mammal flesh contacting a second portion of the periphery of said elongated body, said first portion and said second portion being non-overlapping.

15. The catheter assembly of claim 1 further comprising,

a cutting lumen extending from said first end to said second end of said elongated body, wherein said outer wall includes a cutting aperture into said cutting lumen, and

a surgical cutting wire anchored in said cutting lumen at a location between said cutting aperture and said second end of said elongated body, and extending axially from said location past said cutting aperture toward said first end of said elongated body, wherein said cutting lumen at said first end of said elongated body is adapted to enable an operator to extend said surgical cutting wire to cause a looped portion of said surgical cutting wire to protrude radially through said cutting aperture.

16. The catheter assembly of claim 1 further comprising,

a cutting lumen extending from said first end to said second end of said elongated body, wherein said outer wall includes a cutting aperture into said cutting lumen, and

a surgical cutting element adapted to extend axially from said first end through said cutting lumen toward said cutting aperture, wherein said cutting lumen at said first end of said elongated body is adapted to enable an operator to extend and retract said surgical cutting element radially through said cutting aperture.

17. The catheter assembly of claim 1 further comprising, a surgical cutting wire extending external to said elongated body from a first location proximal to said first end of said elongated body to a second location proximal to said second end of said elongated body, said surgical cutting wire disposed in a fixed relationship to said second location and in a moveable relationship with said first location, said first location being adapted to enable an operator to extend and retract said surgical cutting element to adjust an amount of radial protrusion of said cutting element from said elongated body.

18. The catheter assembly of claim 1, wherein said dilatable bladder has an outer surface and said catheter assembly further comprises, a surgical cutting wire extending adjacent to said outer surface of said dilatable bladder from a first location proximal to said first end of said elongated

body to a second location proximal to said second end of said elongated body, said surgical cutting wire disposed in a fixed relationship to said second location and in a moveable relationship to said first location.

19. The catheter assembly of claim 18, wherein said surgical cutting wire is adapted to extend in response to inflation of said dilatable bladder and retract in response to deflation of said dilatable bladder.

20. The catheter assembly of claim 1, where in said thermally responsive indicator is adapted to exhibit said state by changing color.

21. A method of detecting a location of a blood vessel comprising,

inserting a dilatable bladder into a body of a mammal, at least a portion of said dilatable bladder incorporating a thermally responsive indicator, said thermally responsive indicator being adapted to exhibit a state change in response to detecting a change in temperature, and

observing any said state change to detect said location of said blood vessel.

22. The method of claim 21 further comprising flushing said dilatable bladder with a fluid of a particular temperature to initialize said state of said thermally responsive indicator.

23. The method of claim 22 further comprising performing said flushing step subsequent to said inserting step.

24. The method of claim 21 further comprising inflating said dilatable bladder subsequent to said inserting step.

25. The method of claim 24 further comprising, in response to observing no said change of state,

deflating said dilatable bladder,

adjusting a position of said dilatable bladder inside of said mammal body,

re-inflating said dilatable bladder, and

observing any said change of state to detect said location of said blood vessel.

26. The method of claim 21, wherein said thermally responsive indicator is a thermochromatic material.

27. The method of claim 26, wherein said dilatable bladder has an outer surface and said thermochromatic material is incorporated into said outer surface.

28. The method of claim 26, wherein said dilatable bladder has an inner surface and said thermochromatic material is incorporated into said inner surface.

29. The method of claim 26, wherein said dilatable bladder is formed from a first material and said thermochromatic material is disposed within said first material.

30. A surgical method comprising,

providing a dilatable bladder having a thermally responsive indicator incorporated therewith, said thermally responsive indicator being adapted to exhibit a state in response to detecting a change in temperature,

inserting said dilatable bladder into a body of a mammal,

identifying a location of a blood vessel based at least in part on observing said state,

determining an incision location based at least in part on said identified location of said blood vessel.

31. The surgical method of claim 30 further comprising flushing said dilatable bladder with a fluid of a particular temperature to initialize said state of said thermally responsive indicator.

32. The surgical method of claim 31 further comprising performing said flushing step subsequent to said inserting step.

33. The surgical method of claim 30 further comprising inflating said dilatable bladder subsequent to said inserting step.

34. The surgical method of claim 33 further comprising, in response to observing no said change of state,

deflating said dilatable bladder,

adjusting a position of said dilatable bladder inside of said mammal body,

re-inflating said dilatable bladder, and

observing any said change of state to detect said location of said blood vessel.

35. The surgical method of claim 30, wherein said thermally responsive indicator is a thermochromatic material.

36. The surgical method of claim 35, wherein said dilatable bladder has an outer surface and said thermochromatic material is incorporated into said outer surface.

37. The surgical method of claim 35, wherein said dilatable bladder has an inner surface and said thermochromatic material is incorporated into said inner surface.

38. The surgical method of claim 35, wherein said dilatable bladder is formed from a first material and said thermochromatic material is incorporated into said first material.

39. The surgical method of claim 30, wherein said mammal is a human and said change in temperature is caused by a proximity of said thermally responsive indicator to a blood vessel crossing a ureter.

40. The surgical method of claim 30 further comprising inserting said dilatable bladder into a lumen inside of a said mammal body by way of an endoscopic device.

41. The surgical method of claim 30, wherein said dilatable bladder is substantially compliant.

42. The surgical method of claim 30, wherein said dilatable bladder is incorporated with an elongated body having a first internal lumen, and said method further comprises inflating said dilatable bladder by providing a positive fluid pressure in said first internal lumen.

43. The surgical method of claim 30 further comprising providing a detector element adapted for observing said state of said thermally sensitive material.

44. The surgical method of claim 43, wherein said dilatable bladder is incorporated with an elongated body having an internal lumen extending between said first and second ends of said elongated body, and said surgical method further comprises inserting said detector element through said internal lumen to perform said observing.

45. The surgical method of claim 44, wherein said detector element is a fiber optic camera adapted to enable an operator to perform said observing said state of said thermally responsive material.

46. The surgical method of claim 30 wherein said determining step comprises determining said incision location to be a location other than said location of said blood vessel.

47. The surgical method of claim 30, wherein said dilatable bladder is incorporated with an elongated body, and wherein said dilatable bladder extends around only a first portion of a periphery of said elongated body and said method further comprises radially extending a surgical cutter, adapted to incise mammal flesh, from second portion of said periphery of said elongated body, said first portion and said second portion being non-overlapping.

48. The surgical method of claim 30, wherein said dilatable bladder has an outer surface and is incorporated with an elongated body having first and second ends, and a surgical cutting wire extends adjacent to said outer surface of said dilatable bladder from a first location proximal to said first end of said elongated body to a second location proximal to said second end of said

elongated body, said surgical cutting wire is disposed in a fixed relationship to said second location and in a moveable relationship to said first location, and said method further comprises, inflating said dilatable bladder to radially extend said surgical cutting wire from said elongated body.

49. A surgical method comprising,

positioning a dilatable bladder incorporating a thermochromatic material into a human ureter,

inflating said dilatable bladder to bring said thermochromatic material in proximity with a first location on an inner wall of said human ureter,

observing any change in state of said thermochromatic material,

in response to observing said change in state of said thermochromatic material,

incising said inner wall of said ureter at a second location different from said first location.

50. The surgical method of claim 49 further comprising, in response to observing no said change in state of said thermochromatic material,

deflating said dilatable bladder,

repositioning said dilatable bladder,

re-inflating said dilatable bladder to bring said thermochromatic material in proximity with another different from said first location on said inner wall of said human ureter,

further observing any change in state of said thermochromatic material,

in response to observing said change in state of said thermochromatic material,

incising said inner wall of said ureter at a location different from said other location.

51. The surgical method of claim 50 further comprising, repeating the steps of deflating, repositioning, re-inflating and further observing until a change in said state of said thermochromatic material is observed.

52. The surgical method of claim 49 further comprising, flushing said dilatable bladder with a fluid of a particular temperature to initialize said state of said thermochromatic material.